

Math 31233: Statistical Methods Second Exam

Examiner: Date: 24 – 4 – 2012

Time: 3 – 4

This is a closed book, closed notes exam. You need to justify every one of your

answers. Completely correct answers given without justification will receive little

credit. Do as much as you can. Partial solutions will get partial credit. Look over

the whole exam to end problems that you can do quickly.

|  |  |  |
| --- | --- | --- |
| Problem | Maximum Score | Your  Score |
| 1 | 5 |  |
| 2 | 4 |  |
| 3 | 5 |  |
| 4 | 3 |  |
| 5 | 8 |  |
| Total | 25 |  |



Name: …………………………..

Number: ……………………….

Section: …………………………

*QUESTION (1):* Let be the number of children of a randomly chosen Jordanian family. Its probability distribution is as the following:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
|  | 0.2 | 0.1 | 0.3 | 0.25 | 0.1 | ?? |

1. What is ?

*QUESTION (2):* In a bag there 20000 coins, 500 of which are quarters. If you select 5 coins randomly, what is the probability that you get exactly 2 quarters in the following cases:

1. With replacement? 2) Without replacement?

*QUESTION (3):* Let and be two events such that , Find:

*QUESTION (4):* Given the following information:

Box (1): Contains 3 red (R) and 2 white (W) balls

Box (2): Contains 2 red (R) and 1 white (W) balls

One ball was drawn randomly from Box (1) and put in Box (2), then one ball is drawn from Box (2). Find the probability that the ball drawn from Box (2) is red.

*QUESTION (5):* [4 marks] (1) Let X = the number of typing errors per page of a book is Poisson distribution with standard deviation 3. Find:



(2) [2 marks] Products produced by a machine has a 3% defective rate, what is the probability that the first defective occurs in the fifth item inspected?

(3) [2 marks] The probability of a man hitting the target at a shooting range is . If he shoots 10 times, what is the probability that he hits the target exactly three times? What is the probability that he hits the target at least once?



Statistical Methods 31233 Second Exam

Instructor: Date: 21 – 7 – 2012

Time: 12 – 1

|  |  |
| --- | --- |
| NAME |  |
| NUMBER |  |
| SECTION |  |

Instructions:

Fill in the above clearly. Calculators are permitted. This booklet consists of this cover, pages 3 through 4 containing questions. For all problems you are expected to show all your work. All questions are must be written in the space provided on the page where the question is printed.

|  |  |  |
| --- | --- | --- |
| **Question No.** | **Mark** | |
| **Max** | **Score** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **Total Mark** | **25** |  |



*Question (1):* 1) Find if

2) A class consists of 60% men and 40% women. Of the men, 25% are blond, while 45% of the women are blond. If a student is chosen at random and found to be blond, what is the probability that student is man?

*Question (2):* 1) Let be the number of children of a randomly chosen Jordanian family. Its probability distribution is as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Values of | 0 | 1 | 2 | 3 | 4 | 5 |
| Probability | 0.2 | 0.1 | 0.3 | 0.25 | 0.1 | ?? |

Calculate the following:

2) The number of telephone calls that arrive at a phone exchange is a random variable that follows a Poisson distribution. The expected number of calls per hour at the exchange is 6. What is the probability that the exchange gets at least 1 call in the next hour?

*Question (3):* 1) A salesman makes ten calls a day. The probability that he makes a sale on any call is 0.4. Success on any call is independent of success on any other calls.

1. What is the probability that he makes two sales in a given day?
2. What is the probability that he makes at least two sales in a given day?

2) A box contains 20 items of which 10% are defective. Find the probability that no more than 2 defectives will be obtained in a sample of size 10 in the following cases:

1. With replacement
2. Without replacement



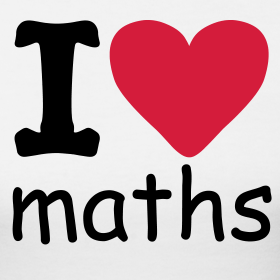
Statistical Methods 20233 ( Second Exam )

Examiner: Date: 23 – 4 – 2013

Time: 4:15 – 5:15

This is a closed book, closed notes exam. You need to justify every one of your answers. Completely correct answers given without justification will receive little credit. Do as much as you can. Partial solutions will get partial credit. Look over the whole exam to end problems that you can do quickly.

|  |  |  |
| --- | --- | --- |
| Problem | Maximum Score | Your  Score |
| 1 | 4 |  |
| 2 | 6 |  |
| 3 | 3 |  |
| 4 | 7 |  |
| Total | 20 |  |



Name: …………………………..

Number: ……………………….

Section: …………………………

***QUESTION (1):*** Suppose and are events such that

. What is ?

***QUESTION (2):*** The following is a probability distribution for a discrete random variable .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | -1 | 0 | 1 | 10 |
|  | 0.2 | 0.5 | 0.2 | 0.1 |

Find:

1)

2) The expected value of

3) The standard deviation of

***QUESTION (3):*** In a survey of 250 juniors majoring in psychology or communications at a large university, the students were asked whether or not they are happy with their majors. The following table gives the result of the survey. Assume that none of these students major in both areas.

|  |  |  |
| --- | --- | --- |
|  | Happy | Unhappy |
| Psychology | 80 | 20 |
| Communications | 115 | 35 |

1. What is the probability that a randomly selected student from this group is happy with the choice of the major?
2. What is the probability that a randomly selected student from this group is neither happy with the choice of the major nor is a psychology major?
3. What is the probability that a randomly selected student from this group is unhappy with the choice of major or is a communications major?

***QUESTION (4):*** A continuous probability distribution function is defined as:

1. Show that
2. Find
3. Find

**( BONUS QUESTION ) [ 4 MARKS ]**

You conduct a phone survey. On average, 10% of calls made on weekdays (Sunday – Thursday) produce a response. On Fridays this figure rises to 20%, and on Saturdays it is 30%. You pick a day from a certain week (Friday – Saturday) at random to conduct your survey, and find that your first call produces a response, what is the probability that you chose a weekday to conduct your survey?



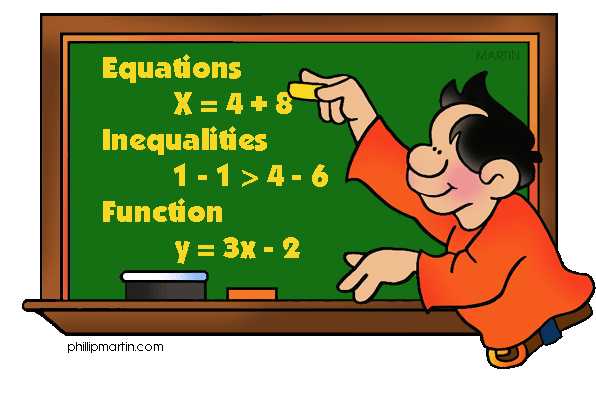
Statistical Methods 20233 ( Second Exam )

Examiner: Date: 12 – 5 – 2013

Time: 10:00 –11:00

This is a closed book, closed notes exam. You need to justify every one of your answers. Completely correct answers given without justification will receive little credit. Do as much as you can. Partial solutions will get partial credit. Look over the whole exam to end problems that you can do quickly.

|  |  |  |
| --- | --- | --- |
| Problem | Maximum Score | Your  Score |
| 1 | 3 |  |
| 2 | 3 |  |
| 3 | 4 |  |
| 4 | 5 |  |
| 5 | 5 |  |
| Total | 20 |  |



Name: …………………………..

Number: ……………………….

Section: …………………………

***QUESTION (1):***  A class contains 8 boys and 7 girls. The teacher selects 3 of the children at random and without replacement. Calculate the probability that the number of boys selected exceeds the number of girls selected.

***QUESTION (2):*** The following is a probability distribution for a discrete random variable .

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  | 0.04 | 0.16 | 0.18 | *k* | 0.14 | 0.17 | 0.09 | 0.03 |

Find:

1) The constant *k.*

2) The expected value of

***QUESTION (3):*** Randomly selected an American household, and let A be the event that the selected household is prosperous and B be the event that it is educated, where *P(A) = 0.15, P(B) = 0.28*, and *P(A and B) = 0.05.*

1. What is the probability that the household selected is either prosperous or educated?
2. What is the probability that a household is prosperous, given that it is educated?
3. What is the probability that a household is educated, given that it is prosperous?
4. Is the two events A and B are independent?

***QUESTION (4):*** A continuous probability distribution function is defined as:

1. Find
2. Find

***QUESTION (5):*** Box I has 2 white and 3 black balls; Box II 4 white and 1 black; and Box III 3 white and 4 black. A Box is selected at random and a ball drawn at random is found to be white. Find the probability that Box I was selected.